

What is claimed is:

1. A semiconductor device comprising a plurality of heterojunction bipolar transistors with their base layer made of GaAsSb or InGaAs, a GaAs substrate, and a buffer layer placed between the base layer and the substrate, wherein the substrate and the buffer layer that lie directly under the intrinsic regions of a part or all of the plurality of heterojunction bipolar transistors are removed.
2. A semiconductor device as recited in claim 1, wherein a part or all of said plurality of heterojunction bipolar transistors are fabricated in collector-up configurations; their intrinsic emitters are made of InAlAs and extrinsic emitters are made of InAlAs including at least one of elements He, B, O, and F; and an emitter electrode is formed directly under the intrinsic regions of a part or all of the plurality of heterojunction bipolar transistors.
3. A semiconductor device as recited in claim 1, wherein a base electrode of each of said heterojunction bipolar transistors is formed in contact with the top surface and side of its base layer and the surface of its adjacent extrinsic emitter region.
4. A power amplifier configured in a monolithic microwave integrated circuit constructed by using a semiconductor device comprising a plurality of heterojunction bipolar transistors with their base layer made of GaAsSb or InGaAs, a GaAs substrate, and a buffer layer placed between the base layer and the substrate, wherein the substrate and the buffer layer that lie directly under the intrinsic regions of a

part or all of the plurality of heterojunction bipolar transistors are removed.

5. A power amplifier as recited in claim 4, wherein said monolithic microwave integrated circuit includes a semiconductor device, capacitors, and resistors, said semiconductor device comprising a plurality of
5 heterojunction bipolar transistors with their base layer made of GaAsSb or InGaAs, a GaAs substrate, and a buffer layer placed between the base layer and the substrate, wherein the substrate and the buffer layer that lie directly under the intrinsic regions of a part or all of the plurality
10 of heterojunction bipolar transistors are removed.

6. A power amplifier as recited in claim 4, wherein said monolithic microwave integrated circuit includes a semiconductor device, inductors, and Schottky diodes, said semiconductor device comprising a plurality of
5 heterojunction bipolar transistors with their base layer made of GaAsSb or InGaAs, a GaAs substrate, and a buffer layer placed between the base layer and the substrate, wherein the substrate and the buffer layer that lie directly under the intrinsic regions of a part or all of the plurality
10 of heterojunction bipolar transistors are removed.

7. A power amplifier as recited in claim 4, wherein said monolithic microwave integrated circuit includes a semiconductor device and heterojunction bipolar transistors fabricated in emitter-up configurations, said
5 semiconductor device comprising a plurality of heterojunction bipolar transistors with their base layer

made of GaAsSb or InGaAs, a GaAs substrate, and a buffer layer placed between the base layer and the substrate, wherein the substrate and the buffer layer that lie directly under the intrinsic regions of a part or all of the plurality of heterojunction bipolar transistors are removed.

10 8. A semiconductor device configured by using a heterojunction bipolar transistor having common emitter current-voltage characteristics in which a collector-emitter voltage is 0.12 V or below at collector
5 current density of 2×10^4 A/cm².

9. A power amplifier configured in a monolithic microwave integrated-circuit constructed by using the semiconductor device as recited in claim 8.

10. A method of fabricating a semiconductor device comprising a plurality of heterojunction bipolar transistors with their base layer made of GaAsSb or InGaAs, a GaAs substrate, and a buffer layer placed between the base layer and the substrate, the method including a process in
5 which the GaAs substrate is removed to an extent covering the intrinsic regions of the plurality of heterojunction bipolar transistors by photolithography and dry etching and the buffer layer is then removed to the same extent.

11. A method of fabricating a semiconductor device as recited in claim 10, further including a process in which an emitter electrode is formed so as to cover the back surface of the semiconductor device finally, following said process.